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ABSTRACT

In an attempt to increase the usefulness of future National Assessment of Educational Progress (NAEP) findings, yet retain the usefulness of past assessments, a framework for the conduct of assessments is presented. This framework is supported by agreement on three major goals, by overall methods for reaching those goals, and by firm concepts of how these goals and methods affect the interrelated phases of assessment work. The three most basic purposes that NAEP should serve over the next five years are: (1) NAEP should provide the basis for a highly credible and useful national report card, (2) NAEP should improve the utility of assessment results for educational policymakers and practitioners, and (3) NAEP should improve the utility of assessment methodology to states and local education agencies. A discussion, on a conceptual level, indicates how the Educational Commission of the States believes NAEP should gather, process, and transmit information and how electronic technology can support these efforts. Generally excluded from this overview of assessment design are the yet to come detailed descriptions of specific assessment activities. Primary type of information provided by report: Program Description (Operating Policies); Procedures (Conceptual). (PN)

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FINAL REPORT ON THE DESIGN OF THE NATIONAL ASSESSMENT OF EDUCATIONAL PROGRESS

Contract No. 400-82-0017

prepared for the
National Institute of Education

by
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Education Commission of the States

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CONTENTS

	Page
Introduction	1
Goals	1
Methods for Reaching These Goals	1
Purposes Served by Goals and Methods	2
Assessment Development	2
The Student Performance Development Framework	3
The Background Variables Framework	3
The Consensus Process	3
Improved Measurement Techniques	3
The 1983-84 Assessment of Reading and Writing and Assessments Thereafter	6
Data Collection	6
Analysis	7
Assessment Utilization	8
Reporting	9
Dissemination	10
Technical Assistance	10
Use of Electronic Technology	11
Assessment Development Support	11
Support for Analysis	11
Utilization Support	11
Enhanced Technology	11
Conclusion	12

DESIGN OF THE NATIONAL ASSESSMENT OF EDUCATIONAL PROGRESS

Introduction

Recent weeks have been a time of intense examination and re-examination of the design of the National Assessment of Educational Progress (NAEP). Working with Research Triangle Institute (RTI) and Westinghouse Information Services and conferring with various outside experts, the Education Commission of the States (ECS) has faced the challenging and often exhilarating task of setting a course that increases the usefulness of future national assessments yet retains the usefulness of past assessments.

It has been in many ways a time of ferment, of wide-ranging discussions about new ways to meet new needs. It has also been a time of rededication, of renewed realization that—even as new needs are met in new ways—what has been uniquely valuable about the National Assessment must continue.

Above all, it has been a productive time of hammering out strategies. The result is a solid framework for the conduct of assessments that is supported by agreement on three major goals, by overall methods for reaching those goals, and by firm concepts of how these goals and methods affect the interrelated phases of assessment work.

The goals and methods are listed below. They are followed by discussion, on a conceptual level, of how ECS believes NAEP should gather, process, and transmit information and how electronic technology can support these efforts. Generally excluded from this overview of assessment design are detailed descriptions of specific assessment activities; these activities will, of course, be discussed thoroughly in ECS's grant application submitted to the National Institute of Education later this month.

Goals

The three most basic purposes that NAEP should serve over the next five years are these:

- NAEP should provide the basis for a highly credible and useful national report card.
- NAEP should improve the utility of assessment **results** for educational policymakers and practitioners.
- NAEP should improve the utility of assessment **methodology** to states and local education agencies.

Methods for Reaching These Goals

The goals are simply stated. But reaching them will not be simple. To guide their efforts in the coming years, ECS, RTI, and Westinghouse have therefore further agreed that the following nine considerations should be

paramount in the design of the assessment. All measures adopted, plans made, and actions taken should:

- Avoid leading to the development of federal tests, standards, or curricula.
- Use a national consensus approach that reflects the diversity of American society.
- Maintain strong, cooperative relations with schools.
- Take into account future needs for information on educational progress.
- Increase the quality of assessment methodology.
- Provide comparability with previous assessments so that trends in education can be measured.
- Complement—but not replace—state and local assessment efforts.
- Make good use of technology.
- Use other resources efficiently.

Purposes Served by Goals and Methods

These goals and methods have served a double purpose in the process of designing a National Assessment that can rise to the complex challenges of the next five years. First, they emerged from the sustained effort to set priorities. That is, they resulted from the process of deciding which issues are of overriding importance. Then, they were built back into the design of the assessment work, becoming the basis for making further decisions.

The information-gathering phase is described below in two sections, one on **Assessment Development** and one on **Data Collection. Analysis** outlines plans for the efficient processing of information. **Assessment Utilization** treats the three major aspects of transmitting information: reporting, dissemination, and technical assistance. A section on **Use of Electronic Technology** describes examples of improved ways to manage NAEP's information resources.

Successful assessments cannot be designed as a series of separate phases. Since all three major goals lead to improving the usefulness of NAEP, ways to bring about that improvement are built into each phase.

Assessment Development

In designing assessments, NAEP must balance three key considerations: the relevance of what NAEP assesses, the validity of its methods and results, and the usefulness of both methods and results for a variety of purposes.

It must, further, base the development of assessments on these primary assumptions:

1. Because the National Assessment is a public enterprise, it should involve a wide range of people in its development activities, using a consensus approach to developing its objectives.

2. Although the assessment items must meet the highest psychometric standards, assessments are not norm-referenced tests and procedures useful in other kinds of testing should be introduced only after considerable thought and research.

3. The Assessment must continue to develop exercises to assess important higher-order skills, resisting the temptation to depend totally on multiple-choice items, which is a false economy.

4. Assessment subject areas can be integrated in ways that enhance the usefulness of findings and do not endanger continuity or validity.

5. It has become increasingly important to gather background information about achievement-related variables that can be altered.

6. A collaborative relationship between NAEP and state or local assessments has mutual technical and financial advantages.

The student performance assessment development framework. ECS believes that NAEP should develop assessments that integrate several subject areas, thereby (1) responding to widespread interest in topics that span subject areas, (2) consolidating into the development of single sets of items resources that were earlier spread across several learning areas, and (3) generating exciting new kinds of information about education. A new framework incorporating communication skills, basic knowledge, and thinking skills can be used to guide decisions about which objectives and achievement items should be included in each integrated assessment. Table 1 shows the framework for developing achievement objectives and items in integrated assessments.

The background variables framework. ECS recommends that NAEP collect more information on achievement-related variables and somewhat different information, emphasizing particularly the acquisition of data about factors and conditions that are amenable to change. Currently, extensive research is being conducted on school effectiveness. Assessments should therefore collect information about achievement-related variables that will help people interpret this research and increase the policy relevance of research findings. It will be especially important to collect information of the sort that will aid people now working in school-improvement programs. Table 2 shows a framework for developing achievement-related variables.

The consensus process. Consensus, defined as a carefully-negotiated general agreement about goals, has been and will continue to be vital to the development of national assessments. But ECS proposes to streamline procedures for reaching consensus by drawing, where appropriate, on the vast experience it has already gained, on materials that are already available from outside sources, and on time-saving, cost-effective new techniques of communication like computer networking.

Improved measurement techniques. ECS anticipates continuing the gradual modification of measurement techniques in response to changing

Table 1

PROPOSED LEARNING AREA DEVELOPMENT MODEL FOR NAEP

SKILLS		KNOWLEDGE of Disciplinary Content
Communication	**Thinking**	
• **Receiving** language and symbols (ways to gain information) Observing Listening Reading	• Recognition/recall • Comprehension (understanding) • Application (abstraction)	• Specific facts • Conventions • Main ideas • Procedures
• **Producing** language and symbols (ways to transmit information) Showing (gesturing) Speaking Graphing/drawing Calculating Writing	• Analysis/synthesis • Evaluation	• Concepts

Table 2
PROPOSED ACHIEVEMENT-RELATED VARIABLE DEVELOPMENT FRAMEWORK FOR NAEP

STUDENT LEVEL All Booklets	SCHOOL LEVEL School Program Questionnaire All Schools
*Age	*Size of community
*Race/ethnicity	*Type of community
*Sex	*Public/private
*Parents' education	*White
Parents' occupation	Minimum competency testing
*Language in home	Total enrollment
*Birth order	Days in school year
*Reading materials in the home	Minutes per class period
	Required classes per day
(17s only)	Amount of time for non-academic instruction
*High school program	Average absenteeism
Employment aspirations	Bused for racial balance
	Type of high school (vocational/academic)
	Average class size
	Amount of parent involvement
	Discipline

Matrix Sample	Department Head or Curriculum Coordinator Questionnaire Matrix or Special Subsample
*TV viewing	Principal as education leader
*Homework	Objectives developed jointly (teachers and principal)
School spirit	School pride, spirit
Positive feedback	High expectations
Teacher quality	Discipline
Teacher organized	Time-on-task
Tutoring	Emphasis on basics
Enrichment classes	In-service educational opportunities
Remedial classes	Amount homework assigned
Self concept	Non-qualified special teachers (math, science, reading, writing)
Attitude towards school	
Recitation opportunities	
Amount writing for classes	
Health	
Mobility (years same house, county)	
Home computer	
*Compensatory education	
Access to school computer	
*Content-specific items	
Courses taken in subject matter	
Electives taken in subject matter	
Grades received	
Teacher's methods in subject matter	
Materials used in subject matter courses	

*Currently collected.

expectations, needs, and technological possibilities. Balancing the efficiency of using easy-to-score multiple choice items with the need to measure higher-order and problem-solving skills remains important, as does preserving NAEP's ability to monitor trends. NAEP should be designed to ensure that NAEP items measure what they purport to measure, allow reporting of skills through organizing items in subsets measuring common domains, and make possible the cautious introduction of procedures for scaling items (like item response theory). Over the longer term, explorations of such possibilities as computer-assisted testing should continue.

The 1983-84 assessment of reading and writing and assessments thereafter. ECS believes NAEP should undertake to integrate, during the 1983-84 school year, the writing assessment required by legislation in 1983-84 and the reading assessment required in 1984-85. For reasons summarized above in the discussion of the student performance development framework, such an integrated assessment is timely and feasible. ECS further believes NAEP should field an integrated mathematics/science/technology assessment in 1985-86.

Although in general this report does not describe specific activities that will be undertaken to carry out integrated assessments, one proposed procedure should perhaps be mentioned here because it represents a significant change from past practice. To reduce printing and scanning costs, and to make it easier for states to gather NAEP-comparable data, ECS believes NAEP should replace machine-scannable booklets, which are very expensive to design and print, with a combination of scannable answer folders and separate (reusable) assessment booklets. Over the longer term, exploration of the possibilities of direct data entry for scoring should continue.

Data Collection

Data collection should continue a tradition of sound methodology, accurate measurement, valid statistical samples, and excellent cooperation by schools. Some alterations of procedure are necessary in the interests of lowering costs and of aiding other aspects of assessment design, like the change to integrated assessments covering several subject areas simultaneously. Three specific changes are particularly important.

- To maintain the comparability of old and new data, the National Assessment should continue to measure the performance of about 60,000 9-, 13-, and 17-year-olds enrolled in public and private schools. But sophisticated analytical techniques can be developed that allow NAEP data to be compared to grade-level data collected by state and local education agencies. Although the generation of grade-level data will be primarily a matter of analysis (see Analysis), it will also involve collecting data at the eighth-grade level with a sample of 3,600 students in the 1983-84 assessment.
- Data should be collected, in alternate years, in three equivalent sessions of six to eight weeks held between November 1 and April 15. All three age groups will be assessed during each of these sessions. The advantages of collecting data in fall, winter, and

spring sessions are several: costs are lower, the burden on school districts is reduced, analysis potential is enhanced, the ability to measure and report trends is maintained, and the correlation of national with state results is simplified.

- A variety of assessment booklets should be administered to each group of students during a single session, with a field administrator replacing paced tapes. This will reduce costs, maximize item and content coverage, and maintain precise national performance estimates.

Another important aspect of data collection design has been mentioned in the preceding section: the use of separate machine-scannable answer folders. Studies should be built into the 1983-84 assessment to allow calibration with past data collection practices.

Analysis

Drawing conclusions about achievement from masses of raw data presents challenging problems that can be resolved in two basic ways. NAEP staff should continue to undertake analysis (of the sort outlined below), and data should be made not only available but also increasingly accessible to outside researchers interested in performing their own analyses.

ECS believes NAEP should continue to use percentages of acceptable responses as its primary indicator of achievement. That is, national assessments should continue to be objective-referenced rather than norm-referenced. It should continue to present summary-level estimates of achievement for age groups as a whole and also for various subgroups—for repeated exercises that allow the measurement of change from one assessment to the next and also for new exercises designed to measure new skills. It should continue to use a national probability sample at each age level. It should continue to deal cautiously with the complex interrelationships of data, basing its methodology for interpreting relationships on weighted class adjustments, Tukey's balancing analysis, correlation analyses, and general linear model techniques.

In three other areas of analysis, ECS proposes that NAEP break new ground.

- NAEP should undertake major research to determine the usefulness of Item Response Theory (IRT) in assessing achievement and change in achievement over time. IRT models, which use mathematical functions to relate the probability of success on an item to the ability measured by the test that contains it, are still highly controversial. But they are also promising in many ways. NAEP should proceed carefully with a parallel analysis for the 1983-84 assessment that will allow comparison of IRT-based results with traditional percent-correct results.
- NAEP should actively pursue ways to relate NAEP data to other data bases and studies. Some potential relationships are direct, like the correlation of NAEP data with census summary tapes.

Others are indirect, like those that can be established using meta-analysis techniques and data from large-scale educational studies like the High School and Beyond study sponsored by the National Center for Educational Statistics.

- NAEP should explore ways of providing estimates of achievement for grades 4, 8, and 11 as well as for ages 9, 13, and 17. Since NAEP already gathers data for age groupings as well as for single ages (assessing the abilities of 9- and 13-year-olds on some of the same items, of 13- and 17-year-olds on some, and of 9-, 13-, and 17-year-olds on others), it will be possible—through use of a carefully designed conversion formula—to interpolate results for grades as well as ages. To check the validity of the formula, a sample of eighth-grade students (including 900 who are not 13 years old) should be assessed in 1983-84. If grade results can be derived from age data, data in future years can be reported both ways.

If a degree of caution has been apparent in the foregoing discussion of recommended analytic strategies, ECS considers this only appropriate. For conducting national assessments is a sensitive matter, and the value of assessment results is all too easily jeopardized by incautious experimentation. Rushing to judgment seems perhaps least advisable in the matter of interpreting the significance of complex and, in some senses, fragile data. Yet, understandably enough, education policymakers, and members of the general public want to know not simply what the data are, but what they mean. ECS therefore recommends a two-part strategy. NAEP itself should continue to exercise reasonable caution in drawing conclusions based on analysis of data. But outside experts—acknowledged leaders in education representing diverse points of view—should be invited to draw their own conclusions about significance. This strategy, which bridges the analysis and reporting phases, is discussed further in the following section.

Assessment Utilization

Basic to the design of the National Assessment is the conviction that the utility of assessments cannot be effectively developed after the fact but must instead be an integral consideration in all phases of assessment work. Broadening the consensus process to include potential users of NAEP information, improving coverage of learning areas and skills, increasing emphasis on alterable variables,* providing grade-level results as well as age-level results, combining NAEP data bases with other bases—these are only some of the steps that can help increase the usefulness of national assessment results and methods to the many different groups concerned about educational progress.

ECS recognizes, however, that developing, collecting, and analyzing useful information is not enough: information must also be packaged appropriately and disseminated to the right people at the right time.

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*Variables amenable to change through policy decisions and instructional approaches.

NAEP conveys two major types of information—results, defined as the findings, analyses, and interpretations resulting from NAEP's data collection efforts, and methods, defined as the features of the assessment methodology itself that others adopt as they undertake assessments.

Analysis of NAEP use indicates that **results** are used most heavily at a national level, **methods** most frequently at the state level. NAEP results are frequently presented and interpreted in national education newsletters, journals, and conferences they often serve as background and context, informing public debate and the exploration of policy options; they are used to plan textbooks. NAEP methodology has served as the model for many state assessment programs.

Clearly, new strategies are needed to ensure the use of NAEP **results** at the state and local level. The collection of achievement-related variable information during the assessment is one important strategy, but changes in reporting, dissemination, and technical assistance are also essential.

Reporting. For the next few years, NAEP reporting strategies should emphasize disseminating NAEP **results** to state and local education decision makers, since NAEP **methods** are already relatively familiar to state and district testing directors.

To help educators, policymakers, and the public understand not only where things stand in American education but also how things got that way, ECS reports should emphasize the relationships between student performance and alterable practices. A key to doing this successfully is to report NAEP findings within the context of evidence from other sources, adding conflicting and supportive data from other studies to interpretations of NAEP data provided by leading educators.

Significant improvement is needed in "packaging" strategies that tailor the medium in which information is presented to the needs of particular audiences. For example, reports should be prepared for curriculum specialists and textbook selection committees that describe results for learning areas and specific skills; analyses of policy issues for legislators, chief state school officers, governors and their aides should relate NAEP results directly to policy in easily-used summary form.

ECS recommends using advances in technology to begin preparing an information data base containing NAEP results in different forms, identified by intended audiences. For example, a NAEP report currently being prepared by ECS summarizes the implications for teaching and testing of findings based on three repeated assessments in writing, reading, and mathematics. This report contains the essential information for chief state school officers, legislators, textbook selection committees, and local educational administrators, but many of the people may not wish—or need—to read the entire report. If the report was entered on word processors at regional information clearinghouses and state educational agencies, however, excerpts could be made available to a school board, say, or to a local administrator. ECS could also develop tailored reports. So could other key information resource centers, with technical assistance from NAEP.

Another important reporting approach is to increase access to user tapes so that larger numbers of researchers can conduct more independent analyses that illuminate educational policy.

Dissemination. The cornerstone of the dissemination effort should be a systematic investigation of decision-making processes to identify key policy groups and individuals. Thereafter, NAEP should emphasize three dissemination strategies:

1. Build on existing networks and information-brokering systems.
2. Make members of NAEP audiences active participants rather than passive consumers by including them in assessment design.
3. Promote NAEP products vigorously.

If ECS administers NAEP, networking holds great promise of success for a number of reasons. ECS is already widely recognized as a reputable broker of information with broad connections not only to the education community but also to policymakers, particularly at the state level. Knowledge utilization theory has confirmed the vital importance of networks as sources of information—especially for decision makers who frequently turn to informal contacts for new ideas and information. Linking with other networks allows ECS to leverage its own efforts, reaching points from which information is distributed to teachers, administrators, board members, and parents, for example, rather than having to reach each individual member of these audiences. Networks are efficient, in the sense that the people who take part in them generally do so because they are already interested in finding and using information.

Encouraging members of NAEP audiences to become active participants in various phases of assessment work has two primary purposes, improving the usefulness of assessments and also their actual use. When, for example, members of a curriculum organization help develop assessments, they have a part to play in deciding which achievement-related variables are most relevant to curriculum concerns. Then, no longer outsiders presented with unfamiliar results but instead insiders who have helped shape those results, they can be encouraged to do secondary research, pass results along to LEAs and teachers, and, in general, increase the use of national assessments.

To strengthen its promotional efforts, NAEP should pay particular attention to its ties with media that, in turn, disperse information to very broad audiences. Special efforts should be made to establish better links with the electronic media like the Public Broadcasting System and National Public Radio. Direct dissemination efforts, like publication of the quarterly NAEP Newsletter (which now reaches more than 36,000 recipients) and of a quarterly bulletin for NAEP data users are also important and should continue.

Technical assistance. Technical assistance has generally played a more important role in supporting the utilization of NAEP methods than of NAEP results. ECS recommends shifts in NAEP's technical assistance

activities. Providing services to individuals is sometimes essential—responding to a telephone inquiry, writing an explanatory letter, doing a special data run. But, whenever possible, NAEP should (1) use materials that have already been prepared (printed or pre-packaged materials, periodic bulletins) and (2) provide services to groups rather than to individuals, concentrating especially on training groups of natural service providers that can in turn train others in the use of NAEP methods. Training the trainers has worked well in the past, and it is an approach that allows NAEP to leverage limited resources.

NAEP should also shift emphasis toward giving technical assistance in dissemination to key information providers at the state level. Another critically important service: providing state assessment directors with models they can use to disseminate assessment results.

Use of Electronic Technology

Tools to improve the use of information resources—hardware, data bases, information systems—are essential to the conduct of all phases of national assessments. NAEP needs to contine increasing its effective use of information resources. It should also continue exploring promising opportunities to incorporate technological advances that will aid the conduct of future assessments.

Selected ways of improving the management of NAEP information resources to support a strong National Assessment are outlined below, as are three areas in which the use of technology can be enhanced.

Assessment development support. Continued automation of the development of items and objectives would be highly useful, so that NAEP staff can review and revise variables interactively. Automated packaging of items and exercises will increase efficiency.

Support for analysis. Continued development of a data base management system that offers rapid response, flexibility in data organization, security safeguards, and access from a variety of perspectives for multiple users is critical. Simple-to-use, on-line methods of access that allow users to sort and query a variety of data bases will expand greatly the analyses that can be done, thus enhancing the reporting of useful results.

Utilization support. To improve the dissemination of information, direct on-line access to data should be provided. Indirect access through public use data tapes should continue.

Enhanced technology. Research in three areas holds special promise for incorporating new technology that will expand or improve the capabilities of NAEP.

Developing **microcomputer application systems** could greatly improve access to NAEP data. The relatively low cost of microcomputers and their

expanding capabilities mean that they are fast becoming widely used tools. It therefore seems appropriate to consider microcomputers as a potentially very useful system for giving local and state education agencies access to NAEP items and objectives.

Modeling and simulation programs could help state and local education agencies and secondary researchers understand the complex relationships between educational progress and educational curriculum, environmental factors, social factors, and budgeting decisions. Another potential use of models, which could be explored, would be to link national assessment data with state and local data.

The time may be fast approaching for **computer-assisted testing**, which allows students whose educational progress is being assessed enter their responses directly into a computer. **Direct data entry** may offer an efficient and cost-effective way to enter and score high-quality data. Thorough exploration of the advantages and disadvantages of these options seems appropriate at this point.

Conclusion

Table 3 contrasts, in summary form, current NAEP practices with new measures designed to preserve trend analysis capability while improving cost-effectiveness and enhancing utility.

When ECS applied for a contract from the National Institute of Education to support development of a design for the National Assessment of Educational Progress, the Commission described in some detail the process it should use to create a design. Although some aspects of design continue to develop, that process is now essentially complete. Task forces have met, conferred, drafted reports, revised reports, conferred again. Outside consultants have contributed broader perspectives in some instances, specialized knowledge in others. ECS management have choreographed meetings, conferred with colleagues at RTI and Westinghouse, reviewed reports, and evaluated options.

One aspect of the process deserves special mention here, because it has had a very direct effect on the design of the national assessment described in this report: even as ECS was designing a National Assessment that would meet the needs of the future, it continued to work on the National Assessment in 1982.

For ECS, the opportunity to stand back from current activities—and to look ahead to broad future prospects—was very welcome. For it made possible a distancing from the day-to-day activities of the current assessments and helped to clarify priorities and bring agreement on major goals. For NIE, the advantages are somewhat different. For the fact that ECS's assessment design was developed in the context of on-going assessment work means that the framework ECS proposes is supported by years of direct experience and solidly grounded in reality.

Table 3

BUILDING A NATIONAL ASSESSMENT FOR THE 1980s: SUMMARY OF CONTRASTS BETWEEN PAST AND FUTURE PRACTICES

Assessment Areas	Past Practices	Future Practices	Enhancement Designed to: Improve Utility	Increase Efficiency	Preserve Trend Data
1. Assessment Cycle Timeline	Total cycle required 57 months, with first report available 12-15 months after end of data collection	Total cycle requires 48 months, with first report available 4-6 months after end of data collection	X	X	X
2. Assessment Development					
a. Learning areas assessed	One or two learning areas, assessed as distinct, separate areas	Multiple learning areas, assessed as an integrated area of learning	X		
b. Objectives and item development process	National consultants and lay reviewers	Similar, but streamlined by greater building on past consensus		X	
c. Assessment items	Multiple-choice and open-ended items	Refined items to measure higher-order cognitive skills	X		
d. Assessment booklets	Students respond in actual assessment booklets	Students respond on separate answer folders		X	
e. Background variable data collected	Demographic, non-alterable variables emphasized	Achievement-related variables dealing with alterable situations or practices emphasized	X		
f. Background variable collection procedures	Generally included in every assessment booklet administered to an age group for the learning area	Some achievement-related variables will be sampled (not included in every booklet); others will be collected by trained field staff	X	X	
g. Total number of assessment booklets	Approximately 40	Approximately 90	X		
h. Criteria for objectives inclusion	What is taught in schools as well as what is needed for future	Similar, with emphasis on what should be learned	X		

Table 3

BUILDING A NATIONAL ASSESSMENT FOR THE 1980s: SUMMARY OF CONTRASTS BETWEEN PAST AND FUTURE PRACTICES
(Continued)

Assessment Areas	Past Practices	Future Practices	Enhancement Designed to: Improve Utility	Increase Efficiency	Preserve Trend Data
3. Data Collection					
a. Populations sampled	9-, 13-, and 17-year-olds	9-, 13-, and 17-year-olds plus 8th grade students who are not 13-year-olds	X		X
b. Data collection schedule	13-year-olds in the fall; 9-year-olds in the winter; and 17-year-olds in the spring	All 3 ages assessed at each of the 3 times (fall, winter, and spring) with equivalent samples for each time period	X	X	X
c. Sample design	Three-stage, stratified probability sample with matrix sampling of items and students	Same, with sample divided into equivalent thirds		X	X
d. Number of schools sampled per assessment booklet	Between 75 and 125 schools depending upon sample size for each assessment booklet	Approximately 300 schools	X	X	
e. Number of students sampled per assessment booklet	Between 1200 and 2500 students	Approximately 550 students		X	
f. Number of students surveyed per field administration	Between 16 and 25 students all responding to the same assessment booklet	Up to 50 students per session, responding to different assessment booklets		X	
g. Field staff	Specifically trained and hired; school staff not required to administer assessment booklets	Same, with field staff further used to collect achievement-related variable information			X
h. Standardization procedures	Prepared audio tapes used for directions and pacing students	Field staff will present instructions and pace students		X	

Table 3

BUILDING A NATIONAL ASSESSMENT FOR THE 1980s: SUMMARY OF CONTRASTS BETWEEN PAST AND FUTURE PRACTICES
(Concluded)

Assessment Areas	Past Practices	Future Practices	Enhancement Designed to: Improve Utility	Increase Efficiency	Preserve Trend Data
4. Analysis					
a. Item level data	Presented for nation, sex, region, race/ethnicity, level of parental education, size and type of community, and grade	Presented for nation, sex, modal grade, and perhaps some of the achievement-related variables		X	
b. Summary level data	Mean percentages and standard errors on objectives or item clusters for nation, region, sex, race/ethnicity, level of parental education, size and type of community, grade, and other background variables	Same, with greater precision plus achievement related variables	X		
c. Reporting variables	Focus on demographic and sociological variables above	Focus on achievement-related variables, though demographic and sociological variables will be initially used for reporting change	X		X
d. Linkage to other data bases	Informal and infrequent	Planned and frequent	X		
e. Secondary research	Public use data tapes provided to encourage secondary research	Same, with increased emphasis and support plus exploration of on-line access for secondary users	X		
f. Types of analyses	Percentages	Same, plus increased emphasis on multivariate analyses	X		X